Supporting Information for

MoS_2 Nanosheets Arrays Rooted on Hollow rGO Spheres as Bifunctional Hydrogen Evolution Catalyst and Supercapacitor Electrode

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Supplementary Figures and Tables

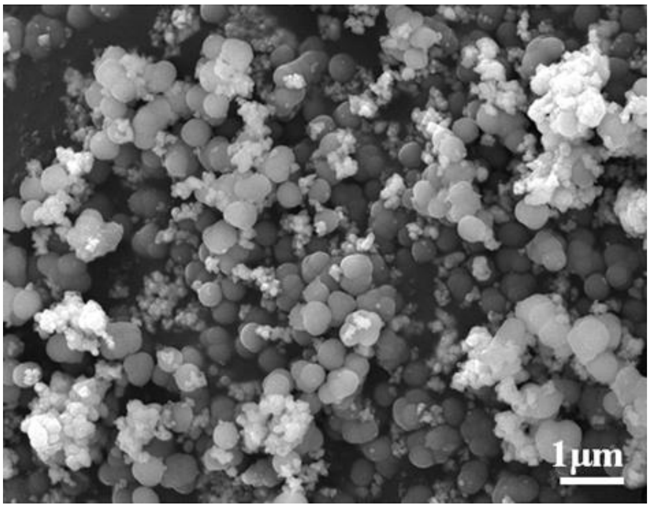

Fig. S1 SEM image of SiO_2/MoS_2 composites

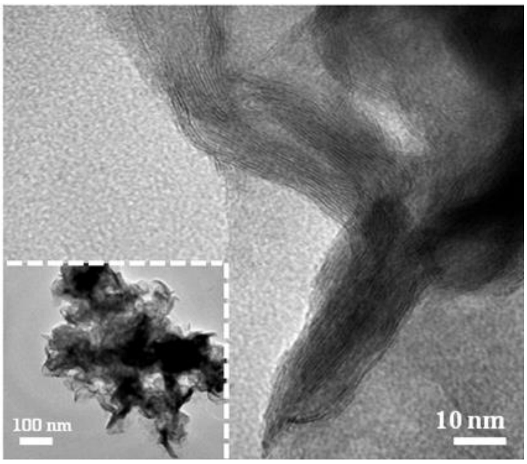

Fig. S2 TEM images of pristine MoS_2. The inset is the low magnification TEM image

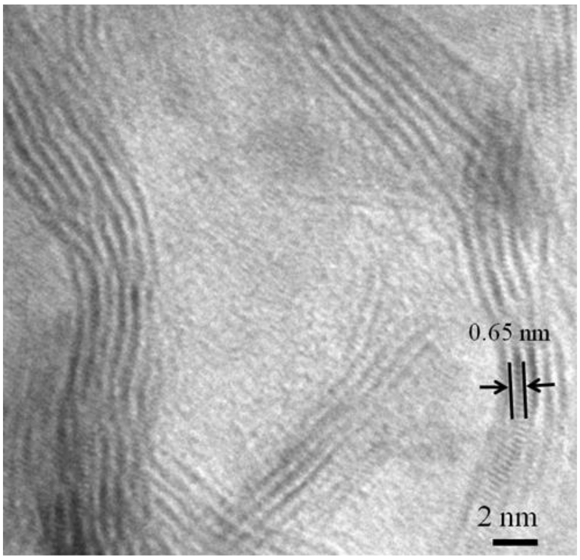

Fig. S3 HRTEM of h-rGO@MoS_2 with expanded (002) interlayer spacing

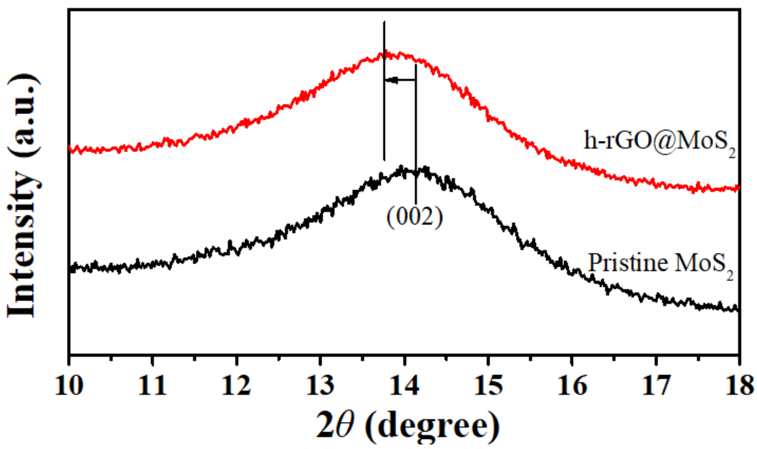

Fig. S4 XRD patterns of the (002) plane peaks of pristine MoS_2 and h-rGO@MoS_2

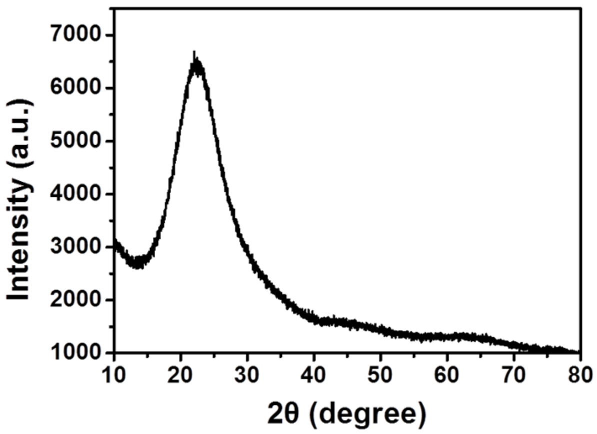

Fig. S5 XRD patterns of amorphous SiO_2 template

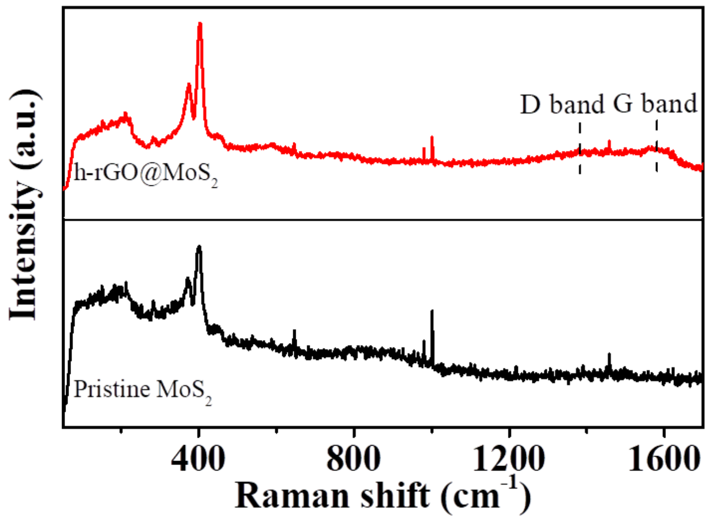

Fig. S6 Raman spectra of pristine MoS_2 and h-rGO@MoS_2

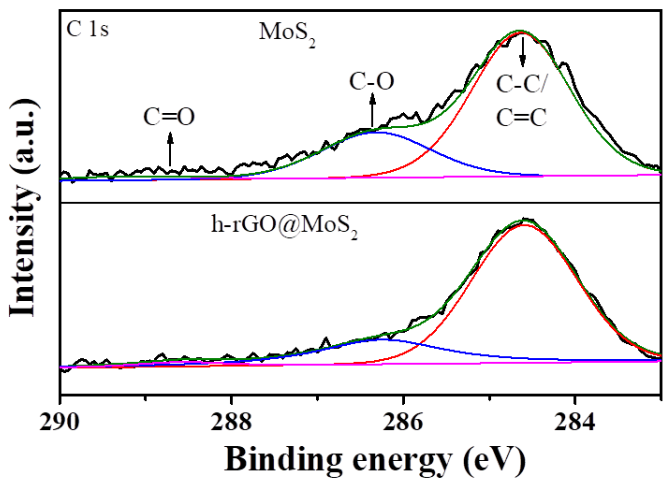

Fig. S7 The high resolution C 1s XPS spectra of pristine MoS_2 and h-rGO@MoS_2

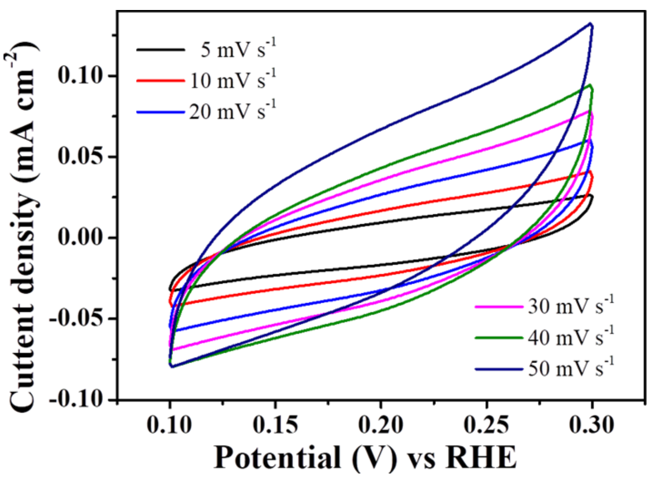

Fig. S8 Electrochemical double-layer capacitances of pristine MoS_2 ranged from 0.1 to 0.3 V at various scan rates (5, 10, 20, 30, 40, and 50 mV s^{-1})

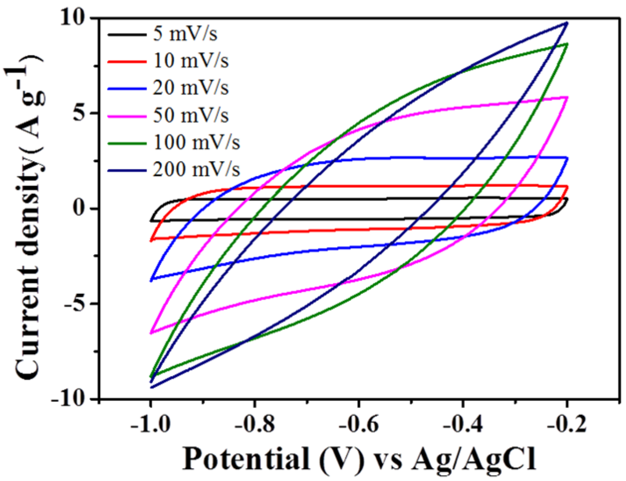

Fig. S9 CV curves of pristine MoS_2 at different sweep rates

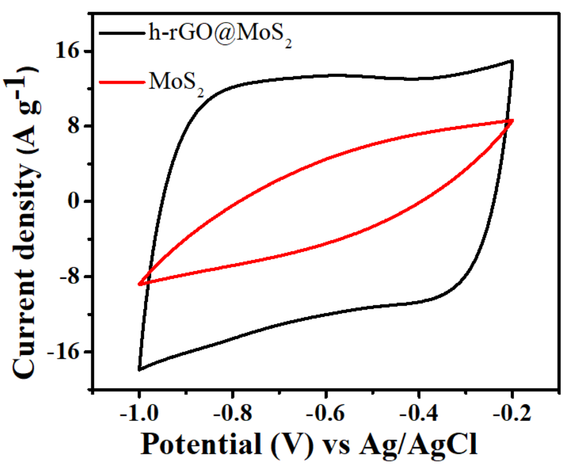

Fig. S10 CV curves contrast between h-rGO@MoS_2 and pristine MoS_2 at scan rate of 100 mV s^{-1}

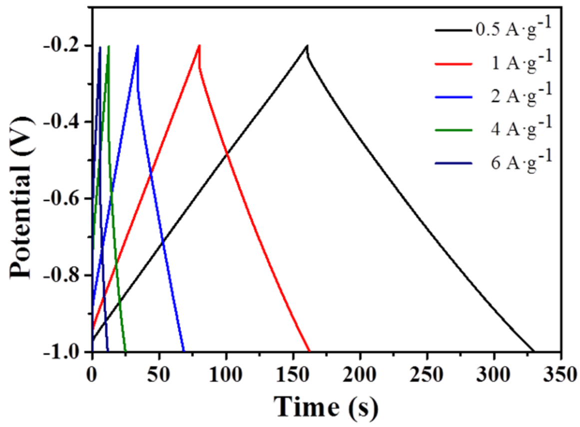

Fig. S11 GCD curves of pristine MoS_2 at various current densities

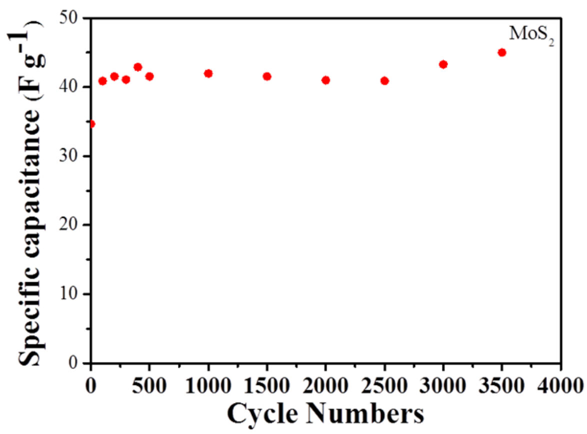

Fig. S12 3500 loops cycle stability of MoS_2 at scan rate of 100 mV s^{-1}

Table S1 MoS_2/graphene electrocatalysts and their performance comparison in onset overpotential and Tafel slope

Electrocatalysts	Onset overpotential (mV)	Tafel slope (mV/decade)	Ref.
(0D/3D) MoS_2 on porous graphene	150	56	1
MoS_2/GO hybrid	150	91.9	2
MoS_2/N-doped graphene nanosheet Aerogels	236	230	3
Microwave-assisted synthesized MoS_2/ graphene	170	80	4
MoS_2 nanoflower-decorated rGO paper	190	90	5
3D MoS_2/rGO hierarchical frameworks	121	46.5	6
MoS_2 vertically rooted on hollow rGO	105	105	This work

Table S2 MoS_2/graphene electrode materials and their capacitive performance in various electrolytes

Electrode material	Specific capacitance ($F\ g^{-1}$)	Current density ($A\ g^{-1}$)	Electrolyte	Ref.
hollow MoS_2	142	1.18	1 M KCl	7
Layered MoS_2-graphene	243	1	1M Na_2SO_4	8
MoS_2/RGO	216	1	1 M H_2SO_4	9
MoS_2/N-doped graphene	245	0.25	1M KOH	10
Assembled MoS_2 microflower	167.7	1	3M KOH	11
h-rGO@MoS_2	238	0.5	1 M Na_2SO_4	This work

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